STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	18.100	Add Flow / Climate Change (%)	0
Ratio R	0.360	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	150	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Surface Network 1

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.657	4-8	0.850	8-12	0.028

Total Area Contributing (ha) = 1.534

Total Pipe Volume (m³) = 35.882

Network Design Table for Surface Network 1

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	92.512	0.296	313.0	0.635	5.00	0.0	0.600	o	375	Pipe/Conduit	
1.001	14.650	0.060	245.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
2.000	15.029	0.086	174.8	0.000	5.00	0.0	0.600	o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	53.74	6.51	152.269	0.635	0.0	0.0	0.0	1.02	112.5	92.4
1.001	52.96	6.73	151.974	0.635	0.0	0.0	0.0	1.15	127.4	92.4
2.000	59.34	5.18	152.000	0.000	0.0	0.0	0.0	1.37	151.0	0.0

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Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.002	38.913	0.164	237.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	37.648	0.159	237.0	0.364	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.000	5.123	0.014	365.9	0.000	5.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	5.288	0.031	167.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.000	57.230	0.183	313.0	0.112	5.00	0.0	0.600	o	375	Pipe/Conduit	
5.000	26.481	0.112	237.0	0.337	5.00	0.0	0.600	o	300	Pipe/Conduit	
4.001	48.821	0.156	313.0	0.086	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.000	12.333	0.063	195.8	0.000	5.00	0.0	0.600	o	375	Pipe/Conduit	
4.002	9.879	0.032	313.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.005	9.157	0.055	166.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.002	50.76	7.36	151.914	0.635	0.0	0.0	0.0	1.02	71.9«	92.4
1.003	48.83	7.98	151.749	0.999	0.0	0.0	0.0	1.02	71.9«	132.1
3.000	59.72	5.10	151.600	0.000	0.0	0.0	0.0	0.82	57.7	0.0
1.004	48.57	8.07	151.586	0.999	0.0	0.0	0.0	1.01	40.0«	132.1
4.000	56.01	5.94	151.926	0.112	0.0	0.0	0.0	1.02	112.5	17.0
5.000	58.18	5.43	151.930	0.337	0.0	0.0	0.0	1.02	71.9	53.1
4.001	52.92	6.74	151.743	0.535	0.0	0.0	0.0	1.02	112.5	76.7
6.000	59.46	5.16	151.650	0.000	0.0	0.0	0.0	1.29	142.6	0.0
4.002	52.35	6.90	151.587	0.535	0.0	0.0	0.0	1.02	112.5	76.7
1.005	48.13	8.22	151.555	1.534	0.0	0.0	0.0	1.01	40.2«	200.0

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Area Summary for Surface Network 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.635	0.635	0.635
1.001	-	-	100	0.000	0.000	0.000
2.000	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
1.003	User	-	100	0.364	0.364	0.364
3.000	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
4.000	User	-	100	0.112	0.112	0.112
5.000	User	-	100	0.337	0.337	0.337
4.001	User	-	100	0.086	0.086	0.086
6.000	-	-	100	0.000	0.000	0.000
4.002	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.534	1.534	1.534

Free Flowing Outfall Details for Surface Network 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.005	HW11	152.497	151.500	0.000	0	0

Simulation Criteria for Surface Network 1

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.100	Storm Duration (mins)	30
Ratio R	0.360		

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Online Controls for Surface Network 1

Hydro-Brake® Optimum Manhole: S54, DS/PN: 1.002, Volume (m³): 19.5

Unit Reference	MD-SHE-0063-2000-1300-2000
Design Head (m)	1.300
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	63
Invert Level (m)	151.914
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	2.0
Flush-Flo™	0.280	1.7
Kick-Flo®	0.564	1.4
Mean Flow over Head Range	-	1.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.4	1.200	1.9	3.000	2.9	7.000	4.4
0.200	1.7	1.400	2.1	3.500	3.2	7.500	4.5
0.300	1.7	1.600	2.2	4.000	3.4	8.000	4.6
0.400	1.6	1.800	2.3	4.500	3.5	8.500	4.8
0.500	1.5	2.000	2.4	5.000	3.7	9.000	4.9
0.600	1.4	2.200	2.5	5.500	3.9	9.500	5.0
0.800	1.6	2.400	2.6	6.000	4.1		
1.000	1.8	2.600	2.7	6.500	4.2		

Hydro-Brake® Optimum Manhole: S50, DS/PN: 1.004, Volume (m³): 12.4

Unit Reference	MD-SHE-0089-3200-0750-3200
Design Head (m)	0.750
Design Flow (l/s)	3.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	89
Invert Level (m)	151.586
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

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Hydro-Brake® Optimum Manhole: S50, DS/PN: 1.004, Volume (m³): 12.4

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.750	3.2
Flush-Flo™	0.225	3.2
Kick-Flo®	0.494	2.6
Mean Flow over Head Range	-	2.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.7	1.200	4.0	3.000	6.1	7.000	9.1
0.200	3.2	1.400	4.3	3.500	6.5	7.500	9.4
0.300	3.2	1.600	4.5	4.000	7.0	8.000	9.7
0.400	3.0	1.800	4.8	4.500	7.4	8.500	10.0
0.500	2.7	2.000	5.0	5.000	7.7	9.000	10.3
0.600	2.9	2.200	5.3	5.500	8.1	9.500	10.5
0.800	3.3	2.400	5.5	6.000	8.4		
1.000	3.6	2.600	5.7	6.500	8.8		

Hydro-Brake® Optimum Manhole: S53, DS/PN: 4.002, Volume (m³): 15.5

Unit Reference	MD-SHE-0068-1700-0550-1700
Design Head (m)	0.550
Design Flow (l/s)	1.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	68
Invert Level (m)	151.587
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.550	1.7
Flush-Flo™	0.163	1.7
Kick-Flo®	0.367	1.4
Mean Flow over Head Range	-	1.5

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.6	0.300	1.6	0.500	1.6	0.800	2.0
0.200	1.7	0.400	1.5	0.600	1.8	1.000	2.2

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Hydro-Brake® Optimum Manhole: S53, DS/PN: 4.002, Volume (m³): 15.5

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
1.200	2.4	2.400	3.3	5.000	4.7	8.000	5.9
1.400	2.6	2.600	3.5	5.500	4.9	8.500	6.1
1.600	2.8	3.000	3.7	6.000	5.1	9.000	6.3
1.800	2.9	3.500	4.0	6.500	5.3	9.500	6.4
2.000	3.1	4.000	4.2	7.000	5.5		
2.200	3.2	4.500	4.5	7.500	5.7		

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Storage Structures for Surface Network 1

Cellular Storage Manhole: S55, DS/PN: 2.000

Invert Level (m) 152.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	368.0	0.0	5.200	0.0	0.0
0.400	368.0	0.0	5.600	0.0	0.0
0.800	368.0	0.0	6.000	0.0	0.0
1.200	368.0	0.0	6.400	0.0	0.0
1.201	0.0	0.0	6.800	0.0	0.0
2.000	0.0	0.0	7.200	0.0	0.0
2.400	0.0	0.0	7.600	0.0	0.0
2.800	0.0	0.0	8.000	0.0	0.0
3.200	0.0	0.0	8.400	0.0	0.0
3.600	0.0	0.0	8.800	0.0	0.0
4.000	0.0	0.0	9.200	0.0	0.0
4.400	0.0	0.0	9.600	0.0	0.0
4.800	0.0	0.0	10.000	0.0	0.0

Cellular Storage Manhole: S56, DS/PN: 3.000

Invert Level (m) 151.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	593.0	0.0	5.200	0.0	0.0
0.400	593.0	0.0	5.600	0.0	0.0
0.401	0.0	0.0	6.000	0.0	0.0
1.200	0.0	0.0	6.400	0.0	0.0
1.600	0.0	0.0	6.800	0.0	0.0
2.000	0.0	0.0	7.200	0.0	0.0
2.400	0.0	0.0	7.600	0.0	0.0
2.800	0.0	0.0	8.000	0.0	0.0
3.200	0.0	0.0	8.400	0.0	0.0
3.600	0.0	0.0	8.800	0.0	0.0
4.000	0.0	0.0	9.200	0.0	0.0
4.400	0.0	0.0	9.600	0.0	0.0
4.800	0.0	0.0	10.000	0.0	0.0

Cellular Storage Manhole: S58, DS/PN: 6.000

Invert Level (m) 151.650 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

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Cellular Storage Manhole: S58, DS/PN: 6.000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	1040.0	0.0	5.200	0.0	0.0
0.400	1040.0	0.0	5.600	0.0	0.0
0.401	0.0	0.0	6.000	0.0	0.0
1.200	0.0	0.0	6.400	0.0	0.0
1.600	0.0	0.0	6.800	0.0	0.0
2.000	0.0	0.0	7.200	0.0	0.0
2.400	0.0	0.0	7.600	0.0	0.0
2.800	0.0	0.0	8.000	0.0	0.0
3.200	0.0	0.0	8.400	0.0	0.0
3.600	0.0	0.0	8.800	0.0	0.0
4.000	0.0	0.0	9.200	0.0	0.0
4.400	0.0	0.0	9.600	0.0	0.0
4.800	0.0	0.0	10.000	0.0	0.0

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 3
Number of Online Controls 3 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.100 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status OFF
Inertia Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 2, 30, 100
Climate Change (%) 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	S1	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
1.001	S2	15 Winter	1	+0%	1/15 Summer			
2.000	S55	360 Winter	1	+0%	30/120 Summer			
1.002	S54	15 Winter	1	+0%	1/15 Summer			
1.003	S47	15 Winter	1	+0%	30/15 Summer			
3.000	S56	2160 Winter	1	+0%	100/180 Winter			
1.004	S50	15 Winter	1	+0%	1/15 Summer			
4.000	S57	15 Winter	1	+0%	30/15 Summer			
5.000	S51	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
4.001	S52	15 Winter	1	+0%	30/15 Summer			
6.000	S58	480 Winter	1	+0%				
4.002	S53	15 Winter	1	+0%	1/15 Summer			
1.005	S48	15 Summer	1	+0%				

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	S1	152.506	-0.138	0.000	0.64			68.5	OK
1.001	S2	152.434	0.085	0.000	0.56			56.6	SURCHARGED
2.000	S55	152.202	-0.173	0.000	0.01			1.5	OK
1.002	S54	152.402	0.189	0.000	0.03			1.7	SURCHARGED
1.003	S47	151.962	-0.087	0.000	0.51			34.2	OK
3.000	S56	151.698	-0.202	0.000	0.03		954	1.3	OK
1.004	S50	151.916	0.105	0.000	0.11			3.2	SURCHARGED
4.000	S57	152.064	-0.237	0.000	0.12			12.6	OK
5.000	S51	152.104	-0.126	0.000	0.62			40.1	OK
4.001	S52	152.058	-0.060	0.000	0.45			46.3	OK
6.000	S58	151.713	-0.312	0.000	0.01		481	1.3	OK
4.002	S53	152.027	0.065	0.000	0.02			1.7	SURCHARGED
1.005	S48	151.612	-0.168	0.000	0.15			4.9	OK

PN	US/MH Name	Level Exceeded
1.000	S1	1
1.001	S2	
2.000	S55	
1.002	S54	
1.003	S47	
3.000	S56	
1.004	S50	
4.000	S57	
5.000	S51	3
4.001	S52	
6.000	S58	
4.002	S53	
1.005	S48	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 3
Number of Online Controls 3 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.100 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status OFF
Inertia Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 2, 30, 100
Climate Change (%) 0, 0, 0, 30

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	S1	15 Winter	2	+0%	30/15 Summer	100/15 Summer		
1.001	S2	15 Winter	2	+0%	1/15 Summer			
2.000	S55	480 Winter	2	+0%	30/120 Summer			
1.002	S54	15 Winter	2	+0%	1/15 Summer			
1.003	S47	15 Winter	2	+0%	30/15 Summer			
3.000	S56	1440 Winter	2	+0%	100/180 Winter			
1.004	S50	15 Winter	2	+0%	1/15 Summer			
4.000	S57	15 Winter	2	+0%	30/15 Summer			
5.000	S51	15 Winter	2	+0%	30/15 Summer	100/15 Summer		
4.001	S52	15 Winter	2	+0%	30/15 Summer			
6.000	S58	480 Winter	2	+0%				
4.002	S53	15 Winter	2	+0%	1/15 Summer			
1.005	S48	15 Winter	2	+0%				

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	S1	152.636	-0.009	0.000	0.79			85.1	OK
1.001	S2	152.470	0.121	0.000	0.80			81.6	SURCHARGED
2.000	S55	152.265	-0.110	0.000	0.01			1.5	OK
1.002	S54	152.426	0.213	0.000	0.03			1.7	SURCHARGED
1.003	S47	152.005	-0.045	0.000	0.67			44.8	OK
3.000	S56	151.714	-0.186	0.000	0.03		1185	1.2	OK
1.004	S50	151.929	0.118	0.000	0.11			3.2	SURCHARGED
4.000	S57	152.110	-0.191	0.000	0.15			15.4	OK
5.000	S51	152.145	-0.085	0.000	0.80			51.9	OK
4.001	S52	152.098	-0.020	0.000	0.54			56.4	OK
6.000	S58	151.733	-0.292	0.000	0.01			1.3	OK
4.002	S53	152.048	0.086	0.000	0.02			1.7	SURCHARGED
1.005	S48	151.612	-0.168	0.000	0.15			4.9	OK

PN	US/MH Name	Level Exceeded
1.000	S1	1
1.001	S2	
2.000	S55	
1.002	S54	
1.003	S47	
3.000	S56	
1.004	S50	
4.000	S57	
5.000	S51	3
4.001	S52	
6.000	S58	
4.002	S53	
1.005	S48	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 3
Number of Online Controls 3 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.100 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status OFF
Inertia Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 2, 30, 100
Climate Change (%) 0, 0, 0, 30

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	S1	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
1.001	S2	15 Winter	30	+0%	1/15 Summer			
2.000	S55	960 Winter	30	+0%	30/120 Summer			
1.002	S54	960 Winter	30	+0%	1/15 Summer			
1.003	S47	15 Winter	30	+0%	30/15 Summer			
3.000	S56	1440 Winter	30	+0%	100/180 Winter			
1.004	S50	15 Winter	30	+0%	1/15 Summer			
4.000	S57	15 Winter	30	+0%	30/15 Summer			
5.000	S51	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
4.001	S52	15 Winter	30	+0%	30/15 Summer			
6.000	S58	720 Winter	30	+0%				
4.002	S53	15 Winter	30	+0%	1/15 Summer			
1.005	S48	30 Winter	30	+0%				

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	S1	153.388	0.744	0.000	1.45			155.9	SURCHARGED
1.001	S2	152.667	0.318	0.000	1.54			155.8	SURCHARGED
2.000	S55	152.590	0.215	0.000	0.01			1.4	SURCHARGED
1.002	S54	152.590	0.376	0.000	0.03			1.7	SURCHARGED
1.003	S47	152.485	0.435	0.000	1.59			106.1	SURCHARGED
3.000	S56	151.808	-0.092	0.000	0.03		956	1.5	OK
1.004	S50	152.049	0.237	0.000	0.11			3.2	SURCHARGED
4.000	S57	152.383	0.082	0.000	0.25			26.3	SURCHARGED
5.000	S51	152.560	0.331	0.000	1.32			85.0	SURCHARGED
4.001	S52	152.357	0.239	0.000	1.19			124.1	SURCHARGED
6.000	S58	151.828	-0.197	0.000	0.02			1.6	OK
4.002	S53	152.114	0.152	0.000	0.02			1.7	SURCHARGED
1.005	S48	151.612	-0.168	0.000	0.15			4.9	OK

PN	US/MH Name	Level Exceeded
1.000	S1	1
1.001	S2	
2.000	S55	
1.002	S54	
1.003	S47	
3.000	S56	
1.004	S50	
4.000	S57	
5.000	S51	3
4.001	S52	
6.000	S58	
4.002	S53	
1.005	S48	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 3
Number of Online Controls 3 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.100 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status OFF
Inertia Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 2, 30, 100
Climate Change (%) 0, 0, 0, 30

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	S1	15 Winter	100	+30%	30/15 Summer	100/15 Summer		
1.001	S2	1440 Winter	100	+30%	1/15 Summer			
2.000	S55	1440 Winter	100	+30%	30/120 Summer			
1.002	S54	1440 Winter	100	+30%	1/15 Summer			
1.003	S47	15 Winter	100	+30%	30/15 Summer			
3.000	S56	1440 Winter	100	+30%	100/180 Winter			
1.004	S50	15 Winter	100	+30%	1/15 Summer			
4.000	S57	15 Winter	100	+30%	30/15 Summer			
5.000	S51	15 Winter	100	+30%	30/15 Summer	100/15 Summer		
4.001	S52	15 Summer	100	+30%	30/15 Summer			
6.000	S58	1440 Winter	100	+30%				
4.002	S53	15 Winter	100	+30%	1/15 Summer			
1.005	S48	15 Winter	100	+30%				

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	S1	154.718	2.074	2.219	2.28			245.5	FLOOD
1.001	S2	153.136	0.788	0.000	0.16			16.2	SURCHARGED
2.000	S55	153.135	0.760	0.000	0.02			1.8	SURCHARGED
1.002	S54	153.135	0.922	0.000	0.03			1.9	SURCHARGED
1.003	S47	153.406	1.357	0.000	2.56			170.4	SURCHARGED
3.000	S56	152.033	0.133	0.000	0.03		1449	1.5	SURCHARGED
1.004	S50	152.328	0.516	0.000	0.11			3.2	SURCHARGED
4.000	S57	152.808	0.508	0.000	0.43			45.3	FLOOD RISK
5.000	S51	153.188	0.959	3.318	1.95			126.1	FLOOD
4.001	S52	152.788	0.671	0.000	1.82			189.2	FLOOD RISK
6.000	S58	151.992	-0.033	0.000	0.02			1.6	OK
4.002	S53	152.230	0.269	0.000	0.02			1.8	SURCHARGED
1.005	S48	151.613	-0.167	0.000	0.15			5.0	OK

PN	US/MH Name	Level Exceeded
1.000	S1	1
1.001	S2	
2.000	S55	
1.002	S54	
1.003	S47	
3.000	S56	
1.004	S50	
4.000	S57	
5.000	S51	3
4.001	S52	
6.000	S58	
4.002	S53	
1.005	S48	

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